

# TERA

[www.tera.co](http://www.tera.co)



## User Manual

# TR-500

# TERA

Welcome to TERA Product Line of Radios

Congratulations on your purchase of TERA high quality two-way radio. The TR-500 model represents the state-of-the-art in high-tech design and features. This radio model features 16 Channels on VHF & UHF bands. Your two-way radio is designed for reliable and trouble free performance for years to come.



## Features:

- VHF/UHF Dual-band (136-174/400-470 MHz)
- 16 Pre-Programmed Channels
- 121 Quiet Codes (38 CTCSS / 83 DCS)
- Time-Out Timer
- Voice Announcements for Channel and Battery Level
- Selectable Hi/Low Power Settings
- Speaker Mic and Earphone Jacks
- Includes long life (25-30 hour) Li-Ion Battery and desk charger

**To get the most out of your radio, please read this manual carefully before use.**

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# TERA

## Online Service and Support

The TERA website provides additional information about obtaining service or support for the TERA line of two-way radios and accessories.



Visit: [www.tera.co](http://www.tera.co)

# User Manual

## Safety Matters

The following recommendations will help you understand this radios safety requirements.

1. Only qualified TERA technicians are allowed to service this two-way radio. Do not disassemble the radio by yourself as it will void the warranty.
2. Use only the TERA brand battery pack and desk charger, so as to not damage the transceiver.
3. Do not expose this radio to long periods of direct sunlight, or hot or humid areas.
4. Do not put this radio in dusty or dirty locations.
5. Do not use harsh chemicals, cleaning solvents, or strong detergent to wash this radio.
6. Never transmit on this radio without an antenna connected.



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### Caution

» Safety and operability of this radio can't be guaranteed unless TERA brand accessories or parts are used.

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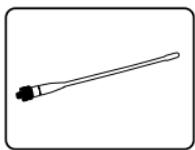
**Check Product**

» Please unpack the radio and the included accessories. We recommend that you check the box for the items listed below to ensure everything is in the box.  
Please contact your dealer should any items be missing from the box.

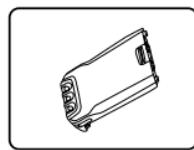
## ◆Included In Box



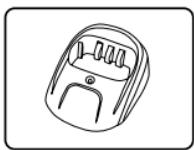
Radio



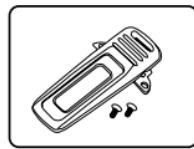
Antenna



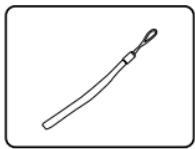
Battery



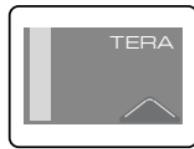
Charger



Belt Clip



Hand Strap



User Manual

## Installing The Belt Clip

To install the belt clip. Place the belt clip over the two rear mounting holes and insert the two supplied phillips mounting screws and secure them into the rear of the radio body. HINT: Install the belt clip with the battery removed as the install will be easier.

## ◆ Getting Acquainted



### Battery Information

Battery Type: Li-Ion 1600 mAh Battery. Please charge the included TERA battery for 1-2 hours before use. Leave the radio or battery pack in the supplied charger cup until the red charging light goes off and the green LED light comes on which indicates the battery pack is fully charged and ready to use.

#### Note:

1. Do not short-circuit the battery terminals or dispose the battery in fire. Never attempt to disassemble the battery pack.
2. Charge the battery in 32-105 F temperature. Otherwise the battery may not fully charge.
3. Turn off the radio before your initial charge. Use of the radio while charging may cause noise or interfere during reception or transmission.

4. Avoid pulling the Radio in and out of the charger during charging to avoid interference with the charging procedure.
5. If the battery life quickly runs down even if it is fully and correctly charged, this means the battery life is over and this battery will need replacing. Please contact your authorized TERA dealer to purchase a new battery.
6. NEVER charge the battery or radio with battery if they are wet. Before charging, you should dry battery off with a towel or cloth to avoid danger.

**Warning:**

Conductive metals such as jewelry, keys or coins may result in short circuit and generate a large quantity of heat when coming to contact with battery electrodes. Treat any battery carefully especially when placing it into pocket, wallet or other metal container as they can short out.

## Charging The Battery Pack

The Radio Battery Pack may be charged either by itself or when connected to the radio body.

To Charge your Battery Pack:



1. Insert the AC power cord into the rear of the desk top charging base. Connect the opposite AC cord and safely plug it into an AC power outlet.
2. Place the battery pack or radio with battery into the charging base with the radio facing forward.
3. A solid red colored LED light will come ON indicating fast charging function. The LED light will change to a green color once the battery pack is fully charged. Typical charging time is 1/2-2 hours depending on your battery level at the time of re-charging.

4. NOTE: If the desk charger has a FLASHING red colored LED light, this means the battery pack is completely discharged. The charger will automatically slow charge the battery pack for 30 minutes then switch to the normal solid red LED charging mode. If the battery charger stays in the FLASHING red LED mode more than 30 minutes, the battery pack may need to be replaced.

### Note

» Trickle charge is not allowed to exceed 30 minutes. If the LED is still flashing in red after 30 minutes, it means that the charger cannot provide power to the battery. Check if the battery or charger is damaged.

### Caution when Charging the Battery

1. The battery is not fully charged from the factory. Please charge the battery before initial use or after long-period of storage.
2. Repeat charging 2 to 3 times will make the battery reach its best capacity. Please replace or charge the battery if battery power is low.
3. The supplied Li-ion battery includes a (6) six month warranty and is good for typically 400-500 charging cycles.

**TIP**

»When storing radio for more than 3 weeks at a time, it is best to remove the TERA battery from radio. This will maintain a full charge in battery so it's ready for use. Batteries will hold a charge 6-12 months when removed from radio.

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## Antenna Information

The supplied flexible antenna is suitable for standard-distance communications. TERA also offers extended length higher gain antennas to increase your communications range. For more information about available accessories, visit: [www.tera.co](http://www.tera.co)

**CAUTION**

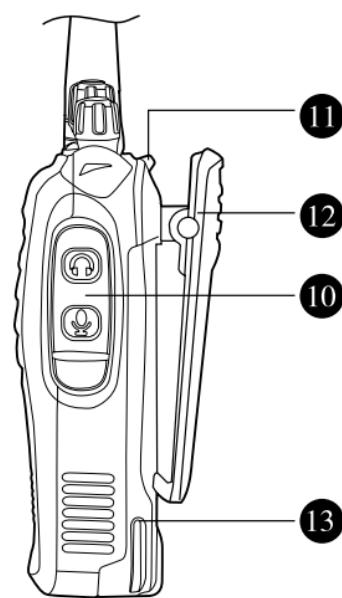
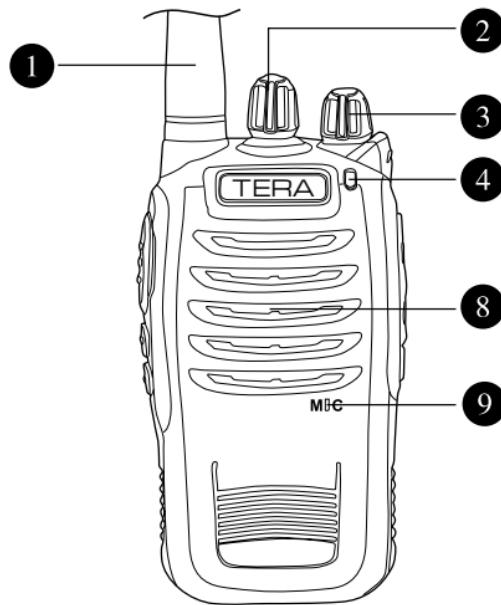
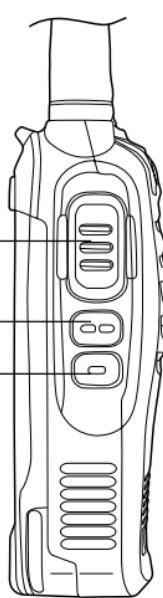
»Radio communication range may be greatly reduced when operating inside of concrete structures like buildings and parking structures.

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## • Radio Overview

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TERA

- ① Antenna
- ② Channel Selector  
Rotate the knob to select channel 1 to 16. The radio will announce the selected channel number, if voice prompt is switched on. Turn to channel 16 to enable scan (see page 18)
- ③ Power Switch / Volume Control  
This knob turns on/off the radio and adjusts the volume. Rotate knob clockwise until a click sound, to turn on the radio; rotate it further to adjust audio volume. Rotate the knob clockwise until the click sound indicates the radio is turned off.
- ④ LED Indicator  
A red glowing LED indicates the radio is transmitting; green when it is receiving; it flashes red when battery power is insufficient; and flashes green during scanning.
- ⑤ PTT Key  
To transmit, press the PTT-Key and speak into the mic; release it to receive.
- ⑥ Mid Key: programmable key  
Short press default setting is battery level  
Long press default setting is channel lock
- ⑦ Low Key: programmable key  
Short press default setting is TX power level  
Long press default setting is monitor
- ⑧ Speaker
- ⑨ Microphone
- ⑩ MIC-SP Jack / Data Port  
To connect the earphone / microphone or data cable
- ⑪ Strap Hole  
To be used with hand strap
- ⑫ Belt Clip
- ⑬ Li-ion Battery

## ◆ Basic Operations

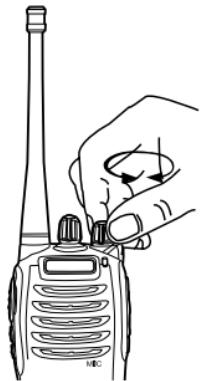
### Power ON/OFF and Volume Control

On top of the radio, the right mounted top knob turns the radio ON/OFF. In addition, turning this knob clockwise increases the volume of the radio. Adjust the volume to your desired audio level.

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### Channel Selection

Rotate the top mounted center knob to select any of the 16 pre-programmed channels. A voice will announce which channel you are on as the channel knob is rotated.



## Monitor Function

Long press the bottom left side key button to open squelch and monitor. Release to enable quiet mode.

## Make A Call

To make a call, hold down [PTT] key and speak into the microphone with normal voice. Please keep the microphone 2 to 4 inches away from your mouth.

### Note:

1. Hold down [PTT] key and the LED glows red, the radio begins to transmit.
2. If LED flashes red during TX, the battery needs re-charging. The radio can not transmit when battery is low. Reduce your TX power level or recharge the battery as soon as possible.

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## Receive A Call

Release [PTT] key to receive a call. A green LED lights up when a signal is incoming.

## Channel Scan Function

NOTE: this function is disabled when radio is shipped from the factory. The channel scan function may be turned ON with the optional programming software and cable. To enable this function, go into the programming software and select which channels you would like to scan by selection "Yes" in the Scan Add column. You can scan from 2-15 channels. To start the channel scan mode, rotate the top mounted channel selector knob on the radio to channel "16" and the radio will begin to scan your pre-selected memory channels. To answer a calling station when scanning, press the radio's PTT button and talk. The radio will transmit on the last received channel while in the scan mode. The scan feature will then auto resume channel scanning after 5 seconds of your last transmit or receive audio activity on that channel. Channel "16" is not available for a memory channel if the scan function is enabled for use.

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## Side Key Operation

The radio's small side keys are programmed from the factory to the following:

**Top small key:** Short Press: Battery Level, Long Press: Channel Lock.

**Bottom small key:** Short press: Select TX Power level, Long Press: Monitor function on. The radio's side keys may be re-programmed to perform other functions with the optional programming software and cable.

## Pre-Programmed Channels

Your radio is pre-programmed with (14) UHF & (2) VHF channels. TERA radios operate on business radio frequencies that are regulated by the FCC. In order to transmit on these frequencies, you are required to have a license issued by the FCC.

Visit: [http://wireless.fcc.gov/services/index.htm?job=service\\_home&id=industrial\\_business](http://wireless.fcc.gov/services/index.htm?job=service_home&id=industrial_business)

Your dealer can also re-program your radio's channels with different frequencies and features as needed.

Channel 1	464.550 MHz	67.0 Tone	1W	Business Ch. CLS-1 (Narrow 12.5 KHz)
Channel 2	467.925 MHz	67.0 Tone	1W	Business Ch. CLS-2 (Narrow 12.5 KHz)
Channel 3	467.850 MHz	67.0 Tone	1W	Business Ch. CLS-3 (Narrow 12.5 KHz)
Channel 4	467.875 MHz	67.0 Tone	1W	Business Ch. CLS-4 (Narrow 12.5 KHz)
Channel 5	469.5125 MHz	77.0 Tone	1W	Business Ch. CLS-54 (Narrow 12.5 KHz)
Channel 6	466.3125 MHz	110.9 Tone	1W	Business Ch. CLS-45 (Narrow 12.5 KHz)
Channel 7	466.3375 MHz	110.9 Tone	1W	Business Ch. CLS-46 (Narrow 12.5 KHz)
Channel 8	466.3625 MHz	110.9 Tone	1W	Business Ch. CLS-47 (Narrow 12.5 KHz)
Channel 9	467.7875 MHz	110.9 Tone	1W	Business Ch. CLS-48 (Narrow 12.5 KHz)
Channel 10	467.8375 MHz	110.9 Tone	4W	Business Ch. CLS-49 (Narrow 12.5 KHz)
Channel 11	467.8625 MHz	110.9 Tone	4W	Business Ch. CLS-50 (Narrow 12.5 KHz)
Channel 12	467.8875 MHz	110.9 Tone	4W	Business Ch. CLS-51 (Narrow 12.5 KHz)
Channel 13	467.9125 MHz	110.9 Tone	4W	Business Ch. CLS-52 (Narrow 12.5 KHz)
Channel 14	469.4875 MHz	110.9 Tone	4W	Business Ch. CLS-53 (Narrow 12.5 KHz)
Channel 15	154.570 MHz	88.5 Tone	1W	VHF Business Ch. (Narrow 12.5 KHz)
Channel 16	154.600 MHz	88.5 Tone	1W	VHF Business Ch. (Narrow 12.5 KHz)

This VHF/UHF Dual-band handheld is FCC Narrow band compliant. Please note the following default TX modulation settings for the TR-500.

#### VHF BAND

136.000-143.995 MHz.....Narrow Band (12.5 KHz) TX, Wide or Narrow RX by channel

144.000-148.000 MHz.....Amateur Band (25.0 KHz) Wide or Narrow band RX/TX

148.005-174.000 MHz.....Narrow Band (12.5 KHz) TX, Wide or Narrow RX by channel

#### UHF BAND

400.000-429.995 MHz.....Narrow Band (12.5 KHz) TX, Wide or Narrow RX by channel

430.000-450.000 MHz.....Amateur Band (25.0 KHz) Wide or Narrow band RX/TX

450.005-470.000 MHz.....Narrow Band (12.5 KHz) TX, Wide or Narrow RX by channel

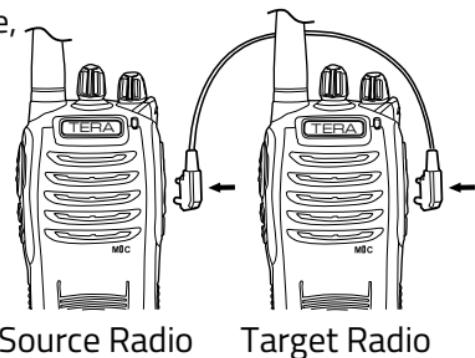
## ◆Wired Clone

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1. Turn clone function by programming software or contact your local dealer.
2. Connect source radio and target radio with clone cable, and turn target radio on.
3. Hold down [Side Key] on Source Radio, then power it up. About 3 seconds later, the LED glows red, which means the Source Radio is ready for cloning.
4. Press [Side Key] on Source Radio again, and the LED on Source Radio flashes red and LED on Target Radio flashes green. The LED on Target Radio goes out when the cloning is finished.
5. Replace the Target Radio with another, then press [Side Key] on Source Radio to begin cloning.

### Tip

» If the LEDs on both Source Radio and Target Radio flashes red and green alternatively, it means the cloning has failed.



# ◆ Troubleshooting

Please check the radio with the troubleshooting chart below to correct any issues.

Fault	Possible Causes	Solution
Radio will not turn ON	1. Battery is not installed correctly 2. Battery power is exhausted 3. Battery aging	1. Install the battery again 2. Charge battery for two hours 3. Purchase a new battery
Receiving light remains on, but the speaker is silent	1. Volume switch is turned down 2. CTCSS enc/decode wrong	1. Check and adjust volume 2. Ensure you use the correct mute method 3. Ensure you have the correct CTCSS/CDCSS tone in use or turned off
No audio from radio speaker	1. Tighten the antenna 2. The local radio FM signal is too weak	1. Screw antenna down until snug 2. Move to place where radio signal is strong 3. Press ▲ key to reset radio, then press ▼ key to select the radio frequency

Receiving light remains on, and you can't transmit	1. BCLO could be turned on	1. Turn off BCLO in software
Radio is transmitting while no one is talking	1. VOX level is set to low (too sensitive)	1. Turn VOX off, or set it to a higher level
Receive voice or interferences	1. You may set a wrong frequency 2. Others on that frequency use the same CTCSS/CDCSS tone	1. Double check your frequency, change to a different one, if needed 2. Choose a different CTCSS/ CDCSS tone

# ◆ Specification

Frequency Range	VHF: 136 ~ 174 MHz (Rx/Tx) UHF: 400 ~ 470 MHz (Rx/Tx)
Channel Number	16 Channels
Voltage	DC 6.6V ~ 8.4V
Temperature Range	-25°C ~ 55°C
Operation	Single Receive VHF / UHF
Output Power	VHF: 5/2W; UHF: 4/1W
Modulation	Wide / Narrow Band
Max. Deviation	$\leq \pm 5$ KHz for Wide Band $\leq \pm 2.5$ KHz for Narrow Band

Residual Wave Transmit	$\leq -36$ dB
Frequency Stability	$\pm 2.5$ PPM
Receiving Sensitivity	$0.2 \mu V$ ( $\geq 18$ dB)
Max. Audio Power	$\geq 700$ mW
Weight	237g
Dimension	124x62x36 mm

## Note

» Without notice, specification are subject to change, according to technological improvements.

## ◆Optional Accessories

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- AAA-50 AAA Alkaline Battery Case
- ANT-50 Stock Rubber Duck Antenna
- BAT-50 1600 mAh Li-ion Battery
- BTE-50 Battery Eliminator w/ cigarette lighter plug
- CEP-50 Covert Earpiece and lapel mic
- CLN-50 Clone Cable (radio to radio)
- CLP-50 Belt Clip
- CRG-50 Single Unit Desk Charger
- CRG-56 6-Unit Multi Charger
- CSC-50 HD Canvas Carry case w/ Stainless swivel belt clip
- OEP-50 Over the ear earpiece w/ lapel microphone
- PRG-50 USB to Radio Programming Cable
- SPMIC-50 Compact Speaker Microphone
- SPMHD-50 Heavy duty Speaker Microphone

WXGAT-RV VHF/UHF High Gain 18" Rubber Duck Antenna

WXSTB-RV VHF/UHF 2 ½" Stubby Flexible Antenna

RPS-TR500-USB Enhanced Windows Pgm Software w/ USB cable

## ◆Service and Support

TERA Radio provides warranty and non-warranty support for this radio and accessories.

### Warranty and Repair Services

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1. TERA two-way radio body has an industry leading 2-year warranty. Radio accessories (battery, charge adapter, charger and antenna, speaker mics) include a 6 month warranty from date of purchase.
2. The radio warranty of 2-years is in effect from the original purchase date on the sales receipt or invoice.
3. Repair or Replacement is available provided the original purchaser's sales receipt copy is included when the radio or accessories are sent in for repairs.
4. Replacement and repair or radios and accessories is provided at the discretion of TERA radio
5. All repaired parts have its own warranty of 90-days from the repair date or the original radio warranty depending on the longer one is valid.

6. The warranty is only valid using this radio for normal use. And guaranty is unavailable under such conditions: dissembling or modifications, damages caused by outside force, water or moisture and usage of unapproved accessories or antenna, not according to the instruction manual and so on.
7. Warranty is void if the TERA label or Serial Number label is missing or torn off.

### **Caution**

1. Read the user manual before use the radio.
2. Do not use the radio with damaged antenna. Use the radio only with standard antenna or optional TERA accessories.
3. Turn off the radio in potential dangerous environment.
4. Avoid the contact between battery and metal objects, oily objects or corrosive objects.
5. Do not dip the radio or battery into water or throw them in fire.
6. Use the radio only with standard battery, adapter, charger and earphone.

## Terms of Warranty

1. TERA two-way radio body has an 2-year guarantee; accessories (battery, charge adapter, charger and antenna), earphone 6 months.
2. Only the original purchasing sales receipt or valid dealer's invoice (The invoice will give clear indication of items purchased and the radio serial-number, and purchasing date).
3. Replacement and repair is available subject to the presentation of original purchasing invoice in case that the radio cannot work normally as the instruction says within 30 days from the purchase date. (Note that there must not be visible abrasion on radio body and accessories).
4. Repair of accessories (battery, adapter, charger and antenna) is available to the presentation of original purchasing invoice.
5. The cost of materials and labor for repair are covered in warranty.
6. Warranty is void in case that the TERA mark or the serial-number mark is torn off.
7. Warranty is void in cases below:
  - 1) Beyond the warranty period;
  - 2) Defects or damages under abnormal use;
  - 3) Defects or damages because of abuse, accident, water penetration

and carelessness;

- 4) Defects or damages because of incorrect testing, operation, repair, installation, reconfiguration or adjustment;
- 5) Defects or damages to antenna because of non-material or non-processing problems;
- 6) Defects or damages because of unauthorized repair and disassembling;
- 7) Product that the serial-number marks is torn off or unable to identify;
- 8) Product with unclear purchasing date on original sales receipt.
- 9) Battery under such conditions:
  - a. Any damages or unsealing to the battery pack;
  - b. Defects or damages to battery because of charging with improper equipment or use beyond regulated maintain condition;

## Warning Notes

Every effort has been made to ensure that the information in this document is complete, accurate, and up to-date. TERA Radio assumes no responsibility for the results of errors beyond its control. The manufacturer of this equipment also cannot guarantee that changes in the equipment made by non-authorized users will not affect the information in it.

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## FCC Licensing Information

This TERA radio operates on Commercial / Land Mobile frequencies which require a license from the Federal Communications Commission (FCC) for business, personal, education and recreational use. To obtain forms, call the FCC forms hotline at:

1-800-418-3676 or go to <http://www.fcc.gov>.

For questions concerning commercial licensing, contact the FCC at 1-888-CALL-FCC (1-888-225-5322).

## Safety

The TERA TR-500 handheld transceiver has been carefully designed to provide you with years of safe, reliable operation. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the radio:

- Read the instructions in this handbook carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the radio and owner's manual.
- Do not carry the transceiver by the antenna. This may damage the antenna or antenna terminal. Grasp the handheld by its base (not the antenna) when you need to place or remove it.
- Do not keep the radio with the antenna very close to, or touching exposed parts of the body, while transmitting. TERA radios will perform best, if you speak 2-4 inches away from the microphone and the radio is vertical.
- Be sure the "PTT" key is not pressed when you do not need to transmit.
- Do not operate the radio near unshielded electrical blasting caps or in an explosive atmosphere.
- Do not transmit without the antenna fitted on the radio.

- Respect the environment conditions. The radio is designed to be used in heavy environments, however avoid exposing it to extremely hot or cold temperature (out of the range between –20 to +140°F). Do not expose the transceiver to excessive vibrations as well as dusty or rainy locations.
- Never try to disassemble or service the radio by yourself (aside from the routine maintenance described in this handbook). It may cause damage to the radio transceiver and void your warranty requiring extensive repair work. Always contact your local dealer for assistance.
- Use only authorized accessories. Using non TERA radio brand accessories may seriously damage your handheld transceiver and void your warranty.
- Do Not spill liquid of any kind into your radio. If the transceiver gets wet, immediately dry it by a soft and clean cloth.
- Switch the radio off before you clean it. Follow the directions described in the paragraph "Care and maintenance".
- Handle the battery properly. Never place the LI-ion battery in your pocket or purse with loose coins. This could result in short circuiting the battery.
- Be certain that your power source matches the rating listed for the supplied battery charger (AC adapter). If you are not sure, check with your authorized TERA dealer.

- Avoid damaging the power cable of the battery charger. Do not step on or place anything on it as this could result in a damaged charger power cord. This product complies with the requirements of the Council Directives 89/336/EEC and 73/23/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility and low voltage.

## **WARNING**

Your wireless hand-held portable transceiver contains a low power transmitter. When the Push-to-Talk (PTT) button is pressed it sends out radio frequency (RF) signals. The device is authorized to operate at a duty factor not to exceed 50% TX and 50% RX. In August 1996, the Federal Communications Commission (FCC) adopted RF exposure guidelines with safety levels for hand-held wireless devices. To maintain compliance with the FCC's RF exposure guidelines, this transmitter and it's antenna must maintain a separation distance of least 2 inches from your face. Speak in a normal voice, with the antenna pointed up and away from the face at the required separation distance. The belt clip is for storage purposes only. AVOID TRANSMITTING ON HIGH POWER WHILE RADIO IS ATTACHED TO YOUR BELT. To transmit, hold the device away from your body and ensure the antenna is at least 2 inches from your body when transmitting.

